

Claims

1. A method for testing a magnetoresistive solid-state storage device, the method comprising the steps of:

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accessing a set of magnetoresistive storage cells, the set being arranged in use to store at least one block of ECC encoded data; and

10 determining whether the accessed set of storage cells is suitable for, in use, storing at least one block of ECC encoded data.

2. The method of claim 1, comprising determining
15 whether there is a greater than acceptable probability that, in use, information will be unrecoverable or that a mis-correct will occur.

3. The method of claim 1, comprising determining,
20 from accessing the set of storage cells, one or more failed cells, and determining symbols in a block of ECC encoded data that, in use, would be affected by the failed cells.

25 4. The method of claim 1, comprising determining, from accessing the set of storage cells, one or more failed cells, determining the position of the identified failed cells, and from this determining one or more symbols of ECC encoded data which, in use, would be
30 affected by failed cells in those positions.

5. The method of claim 4, comprising determining whether there would be more failed symbols in a block of

ECC encoded data than could be reliably corrected by, in use, error correction decoding the block of ECC encoded data.

5 6. The method of claim 1, comprising:

obtaining a parametric value for each of the set of storage cells;

10 comparing each parametric value against a range or ranges; and

identifying failed cell or cells, amongst the set of storage cells, as being affected by a physical failure,
15 where the parametric value falls into one or more failure ranges.

7. The method of claim 6, comprising identifying storage cells for which a logical bit value is derivable.

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8. The method of claim 6, comprising forming a failure count based on the identified failed cells, and comparing the failure count against a threshold value.

25 9. The method of claim 8, comprising using the identified failed cells to determine failed symbols, and wherein the failure count is based on the failed symbols.

10. The method of claim 9, wherein the threshold value
30 represents a number of failed symbols equal to or less than a total number of failed symbols which, in use, could be reliably corrected by error correction decoding a block

of ECC encoded data to be stored in the accessed set of storage cells.

11. The method of claim 10, wherein the threshold
5 value is set to be in the range of about 50% to about 95%
of the maximum number of failed symbols which could be
reliably corrected by error correction decoding the block
of ECC encoded data.

10 12. The method of claim 1, comprising:

writing test data to the set of storage cells;

reading the test data from the set of storage cells;

15 and

comparing the written test data to the read test data
to identify a failed cell or cells amongst the set of
storage cells as being affected by a physical failure.

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13. The method of claim 12, comprising forming a
failure count based on the identified failed cells, and
comparing the failure count against a threshold value.

25 14. The method of claim 12, comprising using the
identified failed cells to determine failed symbols, and
wherein the failure count is based on the failed symbols.

15. The method of claim 14, wherein the threshold
30 value represents a number of failed symbols equal to or
less than a total number of failed symbols which, in use,
could be reliably corrected by error correction decoding a

block of ECC encoded data to be stored in the accessed set of storage cells.

16. The method of claim 15, wherein the threshold
5 value is set to be in the range of about 50% to about 95% of the maximum number of failed symbols which could be corrected by error correction decoding the block of ECC encoded data.

10 17. A method for controlling a magnetoresistive solid-state storage device, comprising the steps of:

accessing a set of magnetoresistive storage cells, the
set being arranged in use to store at least one block of
15 ECC encoded data;

comparing parametric values obtained by accessing the
set of storage cells against one or more ranges;

20 identifying failed cells amongst the accessed set of storage cells;

forming a failure count based on the identified failed
cells;

25 comparing the failure count against a threshold value;
and

determining whether the accessed set of storage cells
30 is suitable for, in use, storing at least one block of ECC encoded data.

18. A method for controlling a magneto-resistive solid-state storage device, comprising the steps of:

accessing a set of magnetoresistive storage cells, the
5 set being arranged in use to store at least one block of
ECC encoded data;

writing test data to the accessed set of storage
cells;

10 reading test data from the accessed set of storage
cells;

comparing the written test data against the read test
15 data, to identify failed cells amongst the accessed set of
storage cells;

forming a failure count based on the identified failed
cells;

20 comparing the failure count against a threshold value;
and

determining whether the accessed set of storage cells
25 is suitable for, in use, storing at least one block of ECC
encoded data.

19. A method for controlling a magnetoresistive solid-state storage device, comprising the steps of:

30 accessing a set of magnetoresistive storage cells, the
set being arranged in use to store at least one block of
ECC encoded data;

comparing parametric values obtained by accessing the
set of storage cells against one or more ranges and
thereby identifying failed cells amongst the accessed set
5 of storage cells;

performing write-read-compare on test data in the
accessed set of storage cells, to thereby identify failed
cells amongst the accessed set of storage cells;

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forming a failure count based on the identified failed
cells;

comparing the failure count against a threshold value;
15 and

determining whether the accessed set of storage cells
is suitable for, in use, storing at least one block of ECC
encoded data.

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20. A magnetoresistive solid-state storage device,
comprising:

at least one array of magnetoresistive storage cells;

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an ECC encoding unit for, in use, forming a block of
ECC encoded data from a unit of original information;

a controller arranged to store the block of ECC
30 encoded data in a set of the storage cells; and

a test unit arranged to access the set of storage
cells, and determine whether the accessed set of storage

cells is suitable for, in use, storing the block of ECC encoded data.

21. An apparatus comprising the magnetoresistive
5 solid-state storage device of claim 20.